3rd Assignment – Functions and distribution fitting

Consider the European extreme wind speeds data described in Assignment 2 and illustrated in Figure 1.

Create a MATLAB program (*.m file) that computes the parameters of the distribution of the extreme wind speeds of the location in **Denmark** applying the method of moments. The extreme wind speeds are assumed to follow the Weibull distribution. The parameter estimation should be implemented in a separate function called *Weibull_fit_dist*. The function should take as input an array of data and return the estimated parameters of the distribution. Use the MATLAB build-in functions *fzero* and *gamma* that are needed for calculating the Weibull shape and scale parameters via the method of moments.

The main program should perform the following tasks:

- Import the data from the file *EuropeanWindStorms.dat* and extract the values of the point location in Denmark. Assign all data entries equal to zero a small value, e.g. 0.5 m/s. (Non-zero elements is a precondition for fitting the Weibull distribution to a data set in MATLAB.)
- Call the function *Weibull_fit_dist* to compute the parameters of the Weibull distribution.
- Plot the cumulative distribution function (CDF) of the fitted distribution and compare with the empirical cumulative frequency diagram of the data (plot both graphs in the same figure).
- Plot the probability plots corresponding to the Normal and the Weibull distributions. Comparing the two probability plots: which distribution fits the data better?
- Use the distribution-fitting tool to fit the data to other distribution models.

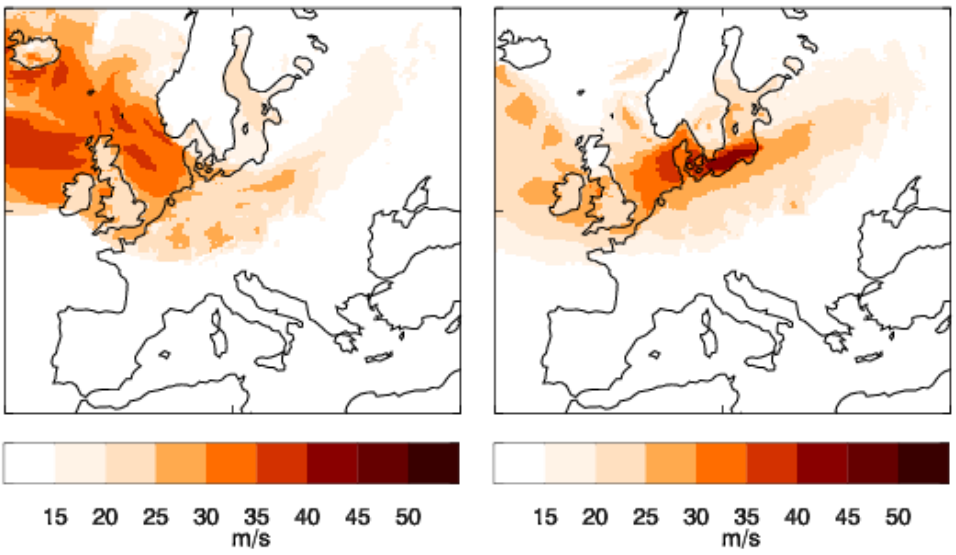

*Figure 1: Example e*xtreme wind speed footprints [m/s] over the whole study area. The 3 second gust wind speed data for the European extreme events provided in the XWS catalogue http://www.europeanwindstorms.org/; *Storm "Lore" (left) and storm "Anatol" (right).*